Comparative Analysis and Factors of Building Collapse in Notable Cities of a nation

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Abstract*: The rate of substandard materials and unprofessional services in Nigeria building industry is rapidly creating undesired effect of building collapse and allied problems. This article compared and analyses building collapse cases and how they contrast in the coastal and landlocked cities of Nigeria. The study considered primary and secondary sources of information and condoned Lagos and Port Harcourt for coastal towns while landlocked cities were represented by Enugu and Kaduna. On the other side, the purchase of poor building materials for construction purposes, quacks workmanship, economic, environmental challenges and change of building usage, defective building design, meager foundation and unusual load also heartens building collapse. Natural forces, manipulation of building management, unprofessional building services, building without town planning approval, political connected problems and noncompliance to national building code were the ten determinants of building collapse in both cities. The study further revealed that, between the cities, there was significant variation in the regularity of building collapse cases. The scenario could be attributed to the fact that building construction and management in the swampy environment or cities of Port Harcourt and Lagos are influence by the quack services quacks that utilized sub-standard materials for the development of landed properties in the marsh region while the cities of Kaduna and Enugu naturally endowed with building materials such as gravel and stones beaconed the implementation of approved building designs on the services and management of the quacks. Sequel to the analysis conclusion, the work recommended that professional bodies or built environment contributors such Nigeria institute of architects(NIA),builders, town planers and their respected registration councils should work in synergy with the relevant government agencies and the political class for review and putting into practices all existing building construction and development laws in Nigeria.

***Keywords*: comparative, analysis, determinants, Building, Collapse, Cities and nation**

I. INTRODUCTION

Many cities in Nigeria are witnessing repaid building collapse and associated environmental problems. These cities are harassed by undesired challenges of structural defection. As the issue of building collapse is fast realizing prominence in the built up areas predominantly in the cities while none or slight is taking place at the rural and suburb areas. This ugly condition is aggravated by the driving force of substandard materials and quack building services which have characterized the implementation of almost all the existing and proposed building projects in the cities. However, as the number of collapse buildings increase in urban areas, millions of populaces continue to inhabit in substandard building and environment. The phenomenon prevails most in residential buildings and neighborhoods found in urban areas where 85% of medium and low income household populate and visible in cities like Lagos, Port Harcourt, Enugu, Kaduna, Abuja etc.

In more than three decades, government at all level (federal, state and local) has enacted the necessary building development and maintenance laws and standard in Nigeria cities. Most prominent is the national building code (NBC, 2006) that specified meticulous materials, standard and agencies in charge of buildings development at various levels and the role they play in building industry. Undesirably, the problems associated with building collapse are increasing and seem to overthrow the statutory bodies regulating building development and its standard in the cities. This ill-starred situation may not be connected with the failure in formulation of the necessary building policies and programs by strategy builders. However, the research tends to determine the challenges of building collapse and sustainable environment in Nigeria. The outcome of the study will assist to recommend actions towards emerging of sound policies for satisfactory building construction in the country.

The study was justifiable as Chendo and Obi (2011) who analyzed the foundations of edifice downfall in Nigeria and itemized unambiguous direction the investors found in the building construction sector and how the occurrences affect the physical environment at large. They abridged that teething troubles involved defective building design, carelessness, and ineffectiveness, out of assembly order, foundation collapses, unusual loads and fraud. Natural problems as well constitute some of the acknowledged bases of collapsed built environment and suggested permanent measures to expunge the problems. The research added that the problems pertaining loss of constructed building became rampant nowadays especially in urban areas like Lagos, Abuja, and Port Harcourt, etc as proven by everyday media intelligences. Abimbola and James (2012) considered a current affair in respect of building loses and her inferences on the side of maintainable expansion in developing country like Nigeria. The work sightsees how the method of building construction by investors connects the doctrines of maintainable development succeeding the flood of building loses in the country. The result revealed that the method of building development among stakeholders of the sector contrast

sustainable ethics, and donates to entire lower presentation of buildings. However, recommended for the general renovation of planning and enactment of strategies for building development codes. They maintained that relevant bodies and building investors in Nigerian were expected to coin out justifiable building actions to enhance paramount practice in building and related sectors.

Also, Olayinka, Abiodun, Ayodeji, Opeyemi, and Daniel (2017) examined after-erection management method of assets and the way such properties may upgrade to enhance the current building failure in Nigeria. The contemporary investigation adopted previous literature review and structured questionnaires issued to residents of exactly 150 residential and 75 commercial houses in Lagos urban. The evaluation was held with frequency, percentage, mean score Likert. The result had shown that manipulation of assets management tasks by building owners and quacks identical personnel when it concerns management of different buildings. The analysis further proved extraordinary stage of displeasure including contributions made available by the unprofessional personnel and uprightness evaluation which is not often conducted by the specialists and subspecialist. The analysis for claimed that the post building organizations should function and developed an elite domain for expert assets administrators. In addendum, their study recommends that buildings should be directed to compulsory validity test, calculation and consequently if possible. Oseghale, Ikpo and Ajayi (2015) used primary data on building experts, purposive sampling method, descriptive statistical which comprises frequency, distribution, percentages and mean score in the course of analyzing the roots of building collapse and its impacts on the cost in the failed building Lagos city of Nigeria. The examination shown the most important sources of structural collapse and defection to include poor or bad design, defective building, over reinforcement/ loading, non- control of permitted drawings for development, control of approved drawings but lack -compliance, and unprofessional involvement. Again, they detailed that property holder's loss about thirty eight million three hundred and eight five thousand, seven hundred and twenty one naira (38,385,721) or one hundred and ninety four thousand, eighty hundred and fifty one dollars ($194,851) seven years ago.

Between 1974 and 2006, Oke ((2011) conducted a study on the bases and concern of building collapse in Nigeria through the adoption primary and ancient information of 1974 – 2006. However, these data were obtained from questionnaire, books, seminar papers, workshop papers, articles and previous cases of structure failure in Nigeria. The statistical analysis were established via tables, bar graphs, Pearson moment correlation coefficient linear regression including 60 collapsed buildings while the result manifested that poor maintenance culture, building design error, poor quality of materials and workmanship, natural phenomenon and excessive loading which accounted 7%, 15%, 52%, 7% and 20%individually determinants of building losses in Nigeria. The exploration also recorded the greatest incidence on individual residential buildings implemented by Nigeria service provider and recommended that government agencies like standard Organization of Nigeria (SON) ought to grown higher effort in disinfecting building materials across the marketplace. That building experts must guarantee accurate direction of bricklayer and proficient check mentation of materials in advance before combination as building component.

In the comparative analysis of building collapse in Abuja, Ibadan, Port Harcourt, Owerri and Lagos Nigeria,Obodoh, Amade, Obodoh, and Igwe (2019) look at the impact of structural collapsed risks towards building stakeholders (major experts in the construction sector, developers, and dwellers) of the completed building in the existing environment of Nigerian. The direction used 1999 as the sample population through the statistical design of Taro Yama and obtained 1860 residents that stood for 93 % questionnaires shared. The matter was presented with frequency tables, pie –charts, bar charts and the findings revealed that, building collapse risks have multifarious factors which were group into financial, socio-political, human connected, physical, environmental and legal risks. Also the investigators recorded impact include loss of property, loss of status and contractors' truthfulness, damage of lives and legal tussle among the investors. The study directed for solutions that drive towards restriction of the entire transitory sources of building failure and the frequent impacts on various income across Nigerians as a developing nation

From the professional data acquired on built environment/ industry as contained in questionnaire, Akaninyene and Saheed (2017) reported the grounds of building collapse and the protective ways that may reduce the incidences, as well as greater rate of its recurrence commonly spread across the vertical and horizontal streets of Nigeria. The research analytical tools include frequency distribution, percentages and mean value. Although the findings revealed that, the key push for buildings failure involved pathetic foundations, wasteful and severe quality control in the area of substandard material usage and management, elimination of the experts, non-appearance and incorrect site analysis, including the arrangement of inexperienced laborers. The measures mapped out by the study were directed towards the management of building construction site by specialists, teaching awareness on the society for the necessity to avoid building failure instead of dealing with locations, engagement of proficient specialist, obtaining of building permit before building erection will be initiated while the inclusion of civil engineer, architects and builders who specialized on structural analysis of buildings and assist to achieve success. Finally, the study managed to shed light on the sufficient acceptance, determinants and the control actions pertaining building fiasco.

Also led to credence is the work of Lewis and Alexander (2018) who analyzed the functional guide and problems of building in Kumasi while gaging Ghana's progress near negligible or naught frequency of building collapse. The study

used the stratified random sampling method that nominated 27 out of 35 building inspection officers at Kumasi Metropolitan Assembly (KMA), a semi structured interview guide was also used and the findings publicized that, apart from lawful stipulated standard, report by developers, building inspection officers were compelled to embark on building environment visitation to gain knowledge about the originators that might started building houses outside notification. They illustrated that developers of many class disrespect all lawful necessities as a result of illiteracy, postponements of building approval, including the encumbrance of conveying building inspections officers at all phases of assemblage. In continuance, they demonstrated that building examiners in Kumasi could not control the degree of building collapse due to limitations involving lack logistics and manpower, unnecessary political interloping along the present environment, as the construction keep on posing danger to the existence of men and housing investment. Their research submitted that Ghana will observe additional structural failures in the recent time when the above-mentioned experiments fail to be resolve. In a way to avoid building failure, the analysis noted compulsorily those edifice inspections within the city of Kumasi and entire Ghana should be armed and authorized by the government.

Within the environmental landscape of Abuja, Lagos , Port Harcourt, Ibadan and Kaduna of Nigeria, Olagunju, Aremu and Ogundele (2013) held analytical study on distorted buildings and narrated how consistent loss of buildings remains a major challenge for professionals and other stakeholders connected with building sector, the clients and building dwellers. However, the ideology of sustaining a permanent elucidation towards the few foundations and impacts of building failure termed to be design, faulty construction, and foundation failure. According to the authours, serious and reasonable recommendations were laid dawn for proper and successful implementation of the counteractive actions. The study finally define breakdown for constructed buildings as the general or partly collapse of a partition or section of an erected building directing the incompetence of finished buildings of achieving safety and stability purposes.

Abimbola and James (2012) had analytical studies on current loss of buildings including the implications of supportable development in Nigeria. The study discovers if the method to erect building sector investor together with the ideologies of ecological improvement and outbreak of building breakdowns all over Nigeria. The investigation revealed about method of construction among separate investors that failed to agree with the sustainable rules, and donates to overall further down the enactment of erected buildings. Their research proffered solution directed on the entire renovation of planning and execution of plans for structural improvement principles and outlines that government at federal level must ensure that principal building investors ought to generate sustainable building processes and apply it for greatest preparation in the entire building sector.

Oloyede, Omoogun and Akinjare (2010) sampled many landlords, academicians and experts in the building sector. The work considered ancient data offailed structures in the past including other issues . The analysis established exactly three(3) principal categories of building investors were confirmed. It added that a current challenge in the building industry in relation to collapse of buildings involves loss of lives and properties. The work emphasized that building experts causes building failure by the application of substandard building components, materials, recruitment of unskilled crafts worker and feeble site supervision for workmen on site. According to them, the denunciations on building downfall are cause by non-conformity to building stipulations/criterions, usage of inferior building materials, paraphernalia and the engagement of useless workers. On the side of the academia, building collapse was triggered by poor execution of the relevant acts and widespread of poor work ethics of Nigerian populations. The work suggested that government should board on pre-emptive way of encouraging the robust political attention directing area town planning experts to establish the legal agenda that will reduce poor assemblage of buildings to reduce the troublesome manners for doing commercial activities in the areas that requires the attention of law courts.

Adebowale, Gambo, Ankeli, and Daniel(2016) evaluated the bases and impacts of building failure towards the nation's economy and the opinion for data that may expect upcoming incidents in the zone under investigation. The researchers found that natural or man-made phenomena and discovered the use of substandard materials, poor workmanship, quacks, poor building code enforcement, and corruption paid enormously when it comes to causes of building disasters. They made a suggestion that stamp out the occurrence of building failure and the manner investors of building industry must abide by the construction code, while standard organization of Nigeria must confirm that all the proficient building materials will be sold for building construction. Secondly, Nigerian government must ensure that every apparatus for severe watching of building sites through the executing of important policies of purification across the construction sectors. Similarly, Oloyed, Omoogun and Akinjare (2010) used structured questionnaire to sample owners of landed property, experts in building industry and previous stories that bothered on building collapse in Nigeria. The result shown that building professionals are blamed usage of low quality building material, engagement of unqualified artesian and weak supervision of building site. Again, the explained that non- compliance with standard, incompetent contractor, non-enforcement and endemic poor work ethic of Nigeria while the study suggested or proffered that, the press should lay additional emphasis enlightening the public more on the dangers of collapsed building.

Ede (2013) used professionals, consultants, contractors and clients to study building Collapse in Nigeria. His findings detailed that regular building failure in the country is increasing on daily basis and the effect is ascetically key;

inferior structural strengthening, structural steel and cement used for the production of foundations, columns, beams and slabs inclusive remains the major determinants of building collapse in Nigeria,

Ayedun, Durodola and Akinjare (2012) reported that second-rate building resources, pitiable workmanship nominated by contractors, use of ineffectual servicers, poor building approach, heavy rainstorm, nonfulfillment with specifications/standards by contractors, poor supervision, structural changes, illegitimate translation and superfluities to completed buildings and broken-down buildings in terms of the key factors of building failures across Lagos city. They suggested that enlightenment of the major investor, experts in the building sector and building owners on the integral dangers of structural collapse plus the requisite for safety awareness.

Abimbola (2006) reported that building collapse is an incident that claims life any time a finished structure pulls down its parts or the general components. By such statement, the author obtained important primary and secondary data from the Lagos State Physical Planning and development authority, national bureau for statistics and central bank of Nigeria's annual reports. The study aimed aims at discovery how collapsed buildings may danger sustainable development of the built environment in Nigeria. However, the analysis via qualitative and quantitative statistics disclosed that the categories of designated buildings such as two, three or four floors. The findings further submit that significant negative connexion exist among the quantity of loss buildings and gross domestic product.

Critically, Fagbenle and Oluwunmi (2010) examined the occurrences of building failure in a developing nation like Nigeria. They considered the role of informal industry present. Their result shown that the buildings collapse occur for reasons such hasty construction, low quality workmanship, poor supervision, inexperience ignorance, evasion/ non-adherence with building code of practice and non-execution of quality building, quality and control on construction. Furthermore, their work established that over 70% of the Nigerian population complained of building failure and curtailed informal activities. From the previous studies, the predominant undesirable impacts of building collapse can be classified into four namely: environmental, economic, social and cultural. The causes, consequences, occurrence and scale of these impacts nevertheless, vary from one urban area to another and across the existing urban developed land uses. Approaches that may instructed for the handling of connected issues, challenges and remedies also vary accordingly. But previous studies that manage to categories the impacts of collapse buildings are scanty. This study therefore, seeks to fill this ascertained gap.

II. METHODOLOGY

The study embraced survey research design**.** Opinion assessment was adopted in the gathering of data for the research. This category of survey guarantees the opinion of separable occupants in the areas to be considered in relative to their view on the collapsed buildings, environmental problems, loss of life and properties. This examination was piloted with the practice of questionnaire and oral interview. The investigation used quantitative information to evaluate people's views in connection to the environmental problems associated with building collapse. The records together encompasses of data on the issues, challenges and remedies of building collapse geographical space. Also considered are length of stay, date of construction, location and the people affected by collapsed buildings in the study area. The types of data applied and their sources are presented in table 1.

Table 1: Sources and Method of Data

S/N	Method of Data Collection	Data Sources	Data Type
1	Literature Review	Textbook, research papers, published and unpublished dissertations and newspapers.	Literature, review on causes of building collapse, impacts and responses.
2	Interview and Structured Questionnaire	Textbook, research papers, published and unpublished dissertations and newspapers	Connected issues, associated problems and environmental sustainability, quality standard.
3	Interviewed& structured Questionnaire	Textbook, research papers, published and unpublished dissertations and newspapers	Loss of lives, households, location of residence, causes of structural failure
4	Interview and structured Questionnaire	Textbook, research papers, published and unpublished dissertations and newspapers	Period of structural defection, building age, professional/quack involvement, contact with collapsed building, specification, standard and substandard material

Source: Research survey 2021.

The population in the study areas is about 10,032,194. A sample size of 1,540 represented 0.075% of the population was selected, hence, 1,540 were administered and 1, 382 questionnaires which represent 85.5% were retrieved for exploration. The 1,382questionnaires were disbursed based on the population of each designated city and these selected clusters were defined based on the occurrence of collapsed

buildings revealed. Lagos city was allocated 40.2% (650) of the questionnaire while Port Harcourt city, Enugu and Kaduna metropolis were allocated 26.7% (450), 21.1 % (250) and 13. % (190) in that order. The academicians were assisted by three students of architecture department from university of Lagos, Rivers state universities, Amadu Bello University and university of Nigeria for Lagos, Port Harcourt, Kaduna and Enugu respectively.

The survey form was administered to family unit in nominated cluster of the four environment of building collapsed. the question comprised of 11 questions which were separated into three section. The first section include questions on determinants of building collapse, environmental problem, affected cities and residents while section 2 encompasses of 15 questions though unit 3 comprises of questions unfolding types of collapsed buildings, loss of lives, movable properties and way forward to escape it. A five opinion likert scale of assessment was embraced to measure respondents opinion (1 = Very Strong, 2 = Strong Reason, 3 = Good Reason, 4 = Poor Reason, 5 = Not a Reason at all). Individual method of interview was also used to gather information from stakeholder in the investigation area. Some of the stakeholder comprises of members of traditional institutions, federal and state ministry of housing, urban development and bureau for national statistics staff.

The study applied the statistical package for the social sciences (SPSS) version 17 for data analysis. Quantitative statistics present the respondents' experience and challenges of building collapse as well as the items and determinants of collapse building. The mean score and standard deviation analysis was used to calculate each variable and presented with tables. The study also examined building collapse variation, loss of lives valuable properties in the major cities of building collapse. The analysis considered remedies and Inferences were drawn in this study by weighing the overall causes of building collapse.

III. ANALYTICAL FRAMEWORK/CONCEPTUAL FRAME/ THEORETICAL FRAMEWORK

Theoretical frame works had been postulated by scholars in respect of building collapse factors. For the purpose of this research, critical reflection of layinka, opeyemi, ayodemi and olatunde (2017) analytical framework for post building development and management services. The analytical framework called multi-party task considered structural integrity evaluation, humdrum administration and suggested counteractive tools for shortening the disastrous outcome of building failure. Therefore the system in respect of purposes, issues, circumstances and sanctions and the reputed relationship are detailed. Also the framework suggested that the finished or accomplished buildings should is required or expected to undergo important reliability test earlier and throughout habitation and certificate of fitness most be obtained from the government.

The concept further demonstrated that property owners are required to engage specialized building administrator to handgrip the management of completed buildings. According to the prolongers, mandatory structural integrity assessment assist in determination of certain problems or challenges that were not discovered at the preliminary stages of drawing and implementation stages and may accelerate building failure during or after building occupation. Some of the challenges may be faulty design, poor workmanship and poor supervision, use of substandard building materials, inappropriate substructure, arbitrary alteration, faulty construction and excessive loading. However, when a particular building fails structural test, such building must be certified unfit for human habitation and sanctioned for controlled destruction and rebuilding. But when a building pass integrity test, certificate of fitness must be approved for human habitation while experts in building /property management instantly embarks on lease administration, space management and building maintenance to escape collapse.

The frame work also detailed that all completed urban buildings requires routine inspection to ascertain the effect and indications of time passage, vertical and horizontal cracks on existing buildings and life-span constituents and remedied through frequent overhaul and upkeep. Whenever report proves inconsistent in the area of maintenance, passageway of time, cracks on building and life span constituents, the building most be subjected to tedious repair and maintenance and planned for episodic structural integrity valuation. But whenever the exercise dictate worrying side by side dilapidation, the building report endorses provisional building integrity evaluation. However, when end product of a particular analysis suggests repaired reinforced or reconstructed property. Any building report about repaired, reinforced or rebuilt properties remains the subjects of designated government actions ascertain fitness and human habitudinal approval. Therefore, this supports the framework for adopting built environment professional in development and management of completed structures. It also criticized the work for not compelling or sanctioning the professionals of building sectors for high financial/construction charges that subject the low income class of the society engaging the quacks during and after buildings construction.

IV. RESULTS AND DISCUSSION

Factors and Analysis of Building Collapse in Notable Cities of a nation

Under the analysis of mean score gotten from the scale of significance, 10 factors of building collapse were determined across the prevalent cities in Nigeria (Port Harcourt, Lagos, Enugu and Kaduna). The frequent and imperative variables of building collapse in major cities of Nigeria. This is potted on table 1. Using the purchase of poor building material occurred as the summit factor or determinant of structural failure in primate, mega and metropolitan city of Nigeria, with a mean significance score of 3.75.This implies that the repeated cases or incident of building collapsed across the major towns and

cities of Nigeria stems from poor purchasing of building by clients who insist to purchase building materials by themselves, instead of engaging professional services on standard purchase of building material for construction purposes. Bribery on the side of building professionals or stakeholders in building industry also subscribe to inferior building materials purposely for personal money making options while developing landed property for the non-members of built environment in Nigeria. The identified variable of building collapse was carefully trailed by poor workmanship and quack(3.55), knowing the current social, economic and environmental challenges of collapsed buildings in the nation, urban occupants especially the higher income class are eager to build and dwell in quality houses. Buildings that banish defection and failure give a sense of safekeeping. such as bribing in building sector and change of building usage, defective building design, meager foundation and unusual load also heartens the collapse of residential and other buildings meant for dissimilar purposes in the cities. Other building collapse indicators in Nigeria major cities are as natural force, manipulation of building management, unprofessional services, building without town planning approval, political connected problems and noncompliance to national building code. The practical analysis endorse the findings of Adebowale, Gambo, Ankeli, and Daniel (2016),who clarified that the reasons accountable for building failure were earlier accredited to either insufficient building materials, natural or artificial occurrences. According to their finding, pitiable workmanship, the habit of quacks / interlopers substituting experts, inability to implement building construction protocols, bribery in the building productiveness etc causes building failure characterized by confrontational impact on the public and dreadful reputation for building/ constructing sector. In persistence, the work noted that Pragmatic information submitted huge loss of finance and materials whenever buildings failure occur in Abuja and port Harcourt city of Nigeria and acclaimed that eradication of such incidences will requires the participation of stakeholder or key players in building industry to complied austerely to the provisions of the structural code while standard organization of Nigeria (SON) must encourage and ensure that proficient construction ingredients are tolerable for building development.

Table 2: Determinants and Analysis of Structural Collapse in Notable Cities of a nation

Building Collapse Evaluation Mechanism	Observations and rating	Mean ± SD
purchase of poor building material	A	3.71±0.61
workmanship and quacks	B	3.55±0.87
meagre foundation and unusual load	C	3.43±0.99
Natural Forces	D	3.39±1.03
manipulation of building management	E	3.38±1.01
Change of building usage	F	3.34±1.07
unprofessional services	G	3.32±1.09
building without town planning approval	H	3.23±1.12
Political connected problems	I	3.08±1.7
Financial problem/construction strategies	J	3.07±1.8

Source: Researchers survey on building collapse 2021

Building Collapse Variation and Loss of Life/ Valuable Properties in Notable cities

For building collapse and associated concerns, The result of the analysis clearly suggest that significant variation exists for buildings collapse, loss of lives, properties and akin problems from corner to corner of noticeable urban settlements at { $F = 15.848$;sig. $= 0.001$; at $p>0.05$). (See table 3).The Duncan multiple evaluation 4 test established that building collapse incident and loss of valuable properties are the same for Lagos and Port Harcourt but differs for Enugu and Kaduna with value of 2.54 and 2.55 for Lagos and Port Harcourt respectively and 2.72, 2.85 for Enugu and Kaduna. The implication is that a construction strategy for higher rising buildings or skyscrapers in Lagos and Port Harcourt involves the quacks and substandard building materials given to the coastal nature of the regions, town planning and standard organization of Nigeria (SON) stipulations and specifications for approval and construction of building work respectively. Unlike Kaduna and Enugu were raw materials for building construction are naturally available and professional services and standard building materials are used for the management and supervision of building site. The view is buttressed by Imafidon and Chukwueme (2020) result revealed that the reasons of building collapse in the area numerically classified into strategy and construction-connected, plan-connected and standard-associated sources. According to the authors, the key and significant grounds of structural failure in a particular clustered variable include: lack of maintenance culture, change of building usage and building with inferior materials in edifice. They called on the statutory bodies empowered to regulate building work and build up struggles in monitoring all about building plans and execution of building projects, beginning from fine-tuning building connected strategies. Suggestive a all-inclusive method to be embraced in handling inferior material for building construction and flow of second-rate production resources within the town under investigation.

Table 3: Building/ Structural Collapse variation in major urban settlement of a nation

Lagos	Port Harcourt	Kaduna	Enugu	P	P value
Mean± SD	Mean ± SD	Mean ± SD	Mean ± SD		
2.55±0.36	2.54±0.35	2.75±0.21	2.85±0.15	15.848	< 0.001

Source: Researchers survey for building collapse 2021.

V. CONCLUSION

The analysis showed that purchase of poor building materials, financial problem/construction strategies, political connected problems, building without town planning approval, unprofessional services, change of building usage, manipulation of building management, Natural Forces,

meager foundation and unusual load and workmanship and quacks determines building collapse in major cities (Port Harcourt, Enugu, Kaduna and Lagos) of Nigeria. The result further established that repeated incidents of Building Collapse, Loss of human Life and valuable properties varies in the aforementioned cities of nation. In the coastal cities of Port Harcourt and Lagos, the frequency of building collapse and its environmental problems are the same but differed between Enugu and Kaduna landlocked zones.

VI. RECOMMENDATIONS

Sequel to the analysis conclusion, the work recommended that expert bodies or built environment contributors such Nigeria institute of architects (NIA), builders, town planers and their respected regulating councils should work in synergy with the relevant government agencies in Nigeria for review and putting into practice of all existing building construction and development laws. The current putting into practice of these policies will enhance standard construction outfit that will banish building failure or collapse in Nigeria town and cities. However, government at various levels should venture into research to proffer lasting solution for building collapse. This is very important in construction industry, proposed built environment and eliminating the undesired loss of human life and valuable properties activated by frequent building collapse. The pressing necessity for consistent generation and collection of professional and non-professional in construction collapse buildings all over the nation. This will qualify professional in construction industry and policy makers develop workaholic strategies on construction standard and management which are capable of expelling building collapse in Nigeria.

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